

## A NEW SPECIES OF LOPHIID ANGLER FISH FROM THE WESTERN NORTH ATLANTIC

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### ABSTRACT

A new species of the lophiid genus *Lophiodes* is described from 76 specimens from the western North Atlantic. Evidence is presented indicating close phylogenetic relationship of the new species to *Lophiodes caulinaris* of the eastern Pacific and *Lophiodes kemp* of the eastern Atlantic. Diagnostic features of the three species are presented.

Information on members of the genus *Lophiodes* in the western North Atlantic is restricted to the description (Le Danois, 1971) and later discussion (Le Danois, 1973; 1974) of *Lophiodes monodi* based on five specimens collected off Martinique. Members of this genus, however, are widespread around the Gulf of Mexico, Caribbean Sea, and southern portion of the western North Atlantic, and two additional undescribed species of *Lophiodes* are found in these waters. One of these species is described below; the second will be described along with an undescribed Pacific species in a forthcoming paper by the first author.

### METHODS

Counts and measurements and comparisons with other species were made by the first author as part of a revision of the family Lophiidae (in preparation). The measurements used in the following description are somewhat unconventional and are based on a system devised by the first author for use in the family revision. They were discussed previously by Caruso and Bullis (1976).

Accurate counts were insured by making incisions to reveal the bases of the dorsal, anal, and pectoral rays. Vertebral counts were determined from radiographs. Computations were performed on the IBM 7044 computer at the Tulane University Computer Center and the Hewlett Packard 3000 computer at the Lafayette College Computer Center. Terminology used in describing the angling apparatus follows Bradbury (1967). Figure 2 was prepared by Bill Komodore, others by the first author.

The 76 specimens examined for this study were obtained on loan from the following institutions: Field Museum of Natural History, Chicago (FMNH); Gulf Coast Research Laboratory, Ocean Springs (GCRL); Museum of Comparative Zoology, Harvard University, Cambridge (MCZ); Rijksmuseum van Natuurlijke Historie, Leiden (RMNH); Stanford University (SU), now at California Academy of Sciences (CAS); Tulane University Museum of Natural History (TU); University of Florida, Gainesville (UF); Rosenstiel School of Marine and Atmospheric Science, Miami (UMML); and the National Museum of Natural History, Smithsonian Institution (USNM).

### *Lophiodes reticulatus* new species

#### Figures 1 and 2

**Diagnosis.**—A species of *Lophiodes* with the dorsal surface of head, body, and pectoral fins covered with distinct reticular pattern; spinous dorsal fin of six spines, cephalic and post-cephalic portions well developed; esca with leaf-like flap, long cirri, and dark, stalked eye-like appendages (Fig. 3); and pale peritoneum.

**Material Examined.**—Holotype of *Lophiodes reticulatus*: USNM 217811, 211.0 mm, ♀; SILVER BAY Station 156; 29°04'N, 85°49'W, Gulf of Mexico off Cape San Blas, Florida; 183–187 m; 52' ST; 22 August 1957.

Paratypes of *Lophiodes reticulatus* (27 specimens): FMNH 45695, 124.1 mm, ♂; OREGON Station 733; 28°50.2'N, 85°43'W, 161 m, 40' ST; 17 December 1962. FMNH 46755, 162.9 mm, ♂; OREGON Station 273; 29°09'N, 85°59'W, 201 m, 40' ST; 18 February 1950. FMNH 46756, 4 (154.0–177.0 mm);



Figure 1. *Lophiodes reticulatus*. Dorsal View of Holotype, USNM 217811, 211.0 mm SL.

OREGON Station 277; 28°48'N, 85°40'W, 190 m, 40' ST; 23 February 1950. FMNH 77265, 153.5 mm, ♀; OREGON Station 2643; 18°03'N, 64°27'W, 274–329 m, 40' ST; 5 October 1959. GCRL V68:2531, 75.9 mm; 29°19'N, 88°14'W. SU 49906, 126.2 mm, ♂; 29°02'N, 85°46'W. TU 94027, 3 (136.1–148.3 mm); OREGON Station 895; 28°47'N, 85°19'W, 117 m; 7 February 1954. TU 90215, 62.4 mm; OREGON Station 13167; 29°15.7'N, 88°09'W, 128 m; JHC 73-344; 3 May 1973. TU 2733, 100.5 mm, ♂; OREGON Station 278; 29°49'N, 85°45'W, 205 m; 24 February 1950. USNM 157676, 2 (160.5, 162.9 mm); 29°09'N, 85°59'W. USNM 157678, 2 (153.3, 246.5 mm); 29°57'N, 86°57.5'W, 150 m. USNM 213632, 5 (71.6–120.5 mm); OREGON Station 6700; 17°27'N, 62°04'W, 249–285 m. USNM 213646, 2 (132.0, 146.9 mm); OREGON Station 3585; 9°12'N, 81°30'W, 247–256 m; 25 May 1962. USNM 215226, 2 (128.4, 169.7 mm); SILVER BAY Station 156; 29°04'N, 85°49'W, 183–187 m; 22 August 1957.

Additional non-type specimens (48 specimens): FMNH 45284, 108.3 mm; 27°20'N, 96°20'W. FMNH 66282, 101.8 mm; OREGON Station 4304; 7°30'N, 55°00'W, 183 m; 6' tumbler dredge; 24 March 1963. FMNH 77263, 71.7 mm; OREGON Station 1894; 15°15'N, 81°19'W, 265 m; 40' ST; 25 August 1957. FMNH 77264, 73.3 mm; SILVER BAY Station 2390; 24°42'N, 80°44'W, 91 m; 40' ST; 26 October 1960. FMNH 77267, 2 (74.6, 76.1 mm); OREGON Station 2286; 07°26'N, 54°49'W, 192–219 m; 40' ST; 8 August 1958. FMNH 77271, 105.2 mm; OREGON Station 1878; 16°39'N, 81°43'W, 229 m; 22 August 1957. FMNH 77278, 94.1 mm; OREGON Station 2666; 18°31.5'N, 66°47'W, 293 m; 40' ST; 8 October 1959. FMNH 77282, 130.5 mm; OREGON Station 2021; 07°18'N, 53°32'W, 183 m; 40' ST; 8 November 1957. FMNH 77283, 2 (128.4, 146.1 mm); OREGON Station 2290; 07°27'N, 54°32'W, 201 m; 8–9 August 1958. FMNH 77284, 2 (76.5, 92.4 mm); OREGON Station 1986; 09°39'N, 59°47'W, 183 m; 40' ST; 4 November 1957. FMNH 77285, 2 (74.9, 87.0 mm); OREGON Station 1867; 16°38'N, 82°43'W, 256 m; 40' ST; 21 August 1957. GCRL V69:3663, 200.0 mm; OREGON Station 32; 29°10'N, 85°55'W, 174 m; 55' ST; 23 June 1950. GCRL V65:1170, 162.3 mm; OREGON Station 1514; 27°50'N, 94°45'W, 238 m; 40' ST; 9 May 1956. MCZ 40927, 130.3 mm; OREGON Station 1879; 16°38'N, 81°39'W, 274 m; 40' ST; 22 August 1957. MCZ 45976, 2 (103.8, 157.4 mm); OREGON Station 4856; 11°08'N, 74°23.8'W, 183 m; 40' ST; 19 May 1964. MCZ 45977, 159.3 mm; OREGON Station 4860; 11°09'N, 74°26'W, 283–293 m; 65' ST; 19 May 1964. RMNH uncat. 07°28'N, 54°03.1'W, 200 m. TU 18823, 2 (87.4, 91.8 mm); OREGON Station 2021; 07°18'N, 53°32'W, 183 m; 40' ST; 8 November 1957. TU 20199, 105.0 mm; OREGON Station 2286; 07°26'N, 54°49'W, 192–219 m; 40' ST; 8 August 1958. TU 78319, 113.7 mm; 27°56'N, 95°00'W, 91 m. UF 19438, 142.4 mm; CALAMAR Station 478; 11°30'N, 61°30'W, 68–82 m. UMML 32949, 150.6 mm; CALAMAR Station 447; 7°00'N, 54°00'W, 93–99m; 15 June 1968. UMML 32950, 74.1 mm; CALAMAR Station 455; 7°00'N, 55°30'W, 88 m; 18 June 1968. UMML uncat. 136.0 mm; OREGON

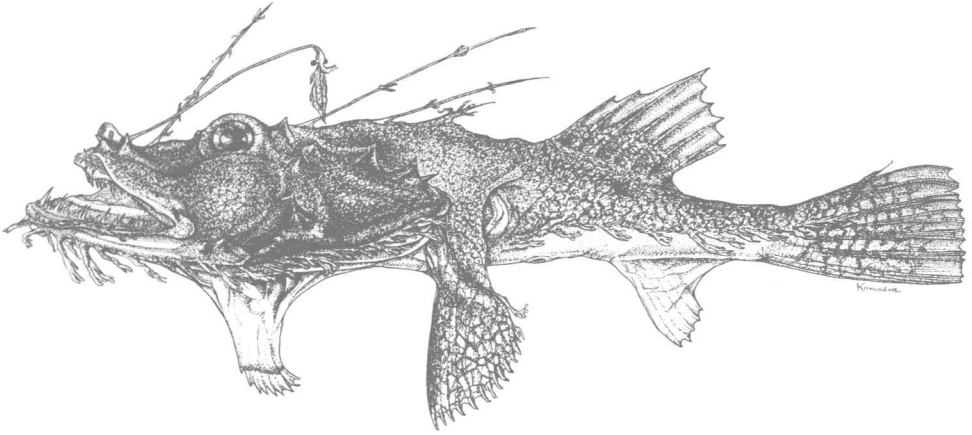


Figure 2. *Lophiodes reticulatus*. Lateral View of Paratype, TU 94027.

Station 3585; 9°12'N, 81°30'W, 256 m; 40' ST; 25 May 1962. USNM 116969, 203.0 mm; Tortugas. USNM 158819, 123.9 mm; Gulf of Mexico. USNM 213618, 150.0 mm; OREGON Station 2664; 18°31.5'N, 66°50.0'W, 329 m; 40' ST; 7 October 1959. USNM 213621, 97.5 mm; OREGON Station 10991; 18°58'N, 95°24'W, 184 m; 70' ST; 11 June 1970. USNM 213628, 144.6 mm; OREGON Station 10994; 19°08'N, 93°04'W, 183 m; 150' PT; 14 June 1970. USNM 213638, 110.0 mm; OREGON Station 10291; 11°26'N, 73°30'W, 201 m; 71' ST; 6 December 1968. USNM 213639, 78.5 mm; OREGON Station 4872; 11°01.8'N, 75°14'W, 64 m; 65' ST; 23 May 1964. USNM 213641, 157.4 mm; OREGON Station 10622; 07°27'N, 54°20'W, 201 m; 40' ST; 16 May 1969. USNM 213643, 114.2 mm; OREGON Station 3625; 16°26'N, 81°35'W, 219 m; 40' ST; 6 June 1962. USNM 213645, 117.7 mm; OREGON Station 10511; 08°25'N, 58°23'W, 93 m; 52' FT; 27 April 1969. USNM 213649, 67.7 mm; OREGON Station 10513; 08°26'N, 58°11'W, 183 m; 52' FT; 27 April 1969. USNM 213679, 83.8 mm; OREGON Station 2001; 07°55'N, 57°25'W, 91 m; 5 November 1957. USNM 213680, 2 (65.7, 127.4 mm); OREGON Station 1986; 09°39'N, 59°47'W, 183 m; 40' ST; 4 November 1957. USNM 213682, 95.6 mm; OREGON Station 2021; 07°18'N, 53°32'W, 183 m; 40' ST; 8 November 1957. USNM 215007; OREGON Station 5025; 11°08'N, 60°58'W, 73–88 m. USNM 215008; OREGON Station 3587; 09°18'N, 80°25'W, 137 m. USNM 215001; OREGON Station 2666; 18°32'N, 66°46.5'W, 366 m.

**Description.**—Coloration in both living and preserved specimens light to dark brown background with darker reticulations on dorsal surface of head, body, and pectoral fins and proximal portion of soft dorsal and caudal fins, reticulations obscure on most of dorsal surface on dark specimens, but prominent on distal portion of pectoral fin; ventral surface light tan to nearly white; soft dorsal with reticulations covering rays only, inter-radial membranes translucent to clear; anal fin as ventral surface or slightly darker; pelvic fins as ventral surface proximally, darker distally; pectoral fins as described above dorsally, ventral surface and ray tips light tan; inside of mouth pallid with occasional reticulations on tongue, two diffuse dark patches on floor of mouth posterior to lower pharyngeals, in single live juvenile specimen observed, these were discrete circular black areas each surrounded by ring of white and clearly resembling eyes; dorsal surface of head and body with scattered tendrils, five bilateral pairs of enlarged dark tendrils at the following locations: small pair at the angle of the mouth near posterior ends of maxillae, large pair at level of gill openings, large pair at level of humeral spines, and very large pair lateral to middle of soft dorsal fin; illicium long (26.9–39.9% of SL), lightly pigmented, devoid of tendrils, retracted reaches from epiotic spines to end of neurocranium; esca with leaf-like flap, long cirri, and dark, stalked eye-like appendages (Fig. 3); second dorsal spine long (21.6–32.6% of SL), pigmented as dorsal surface, many small pale tendrils present, retracted

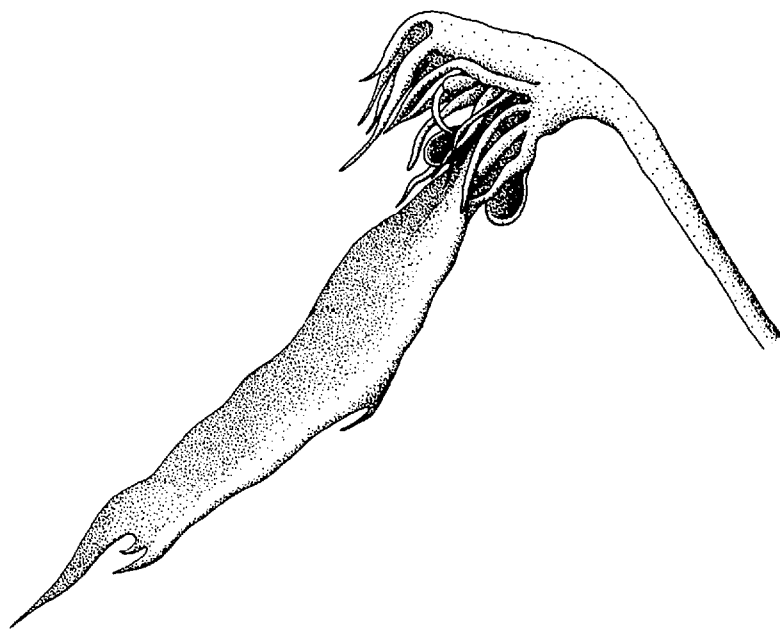


Figure 3. ESCA of *Lophiodes reticulatus*. (FMNH 46756, ♂, 182.0 mm SL) scale = 1 mm.

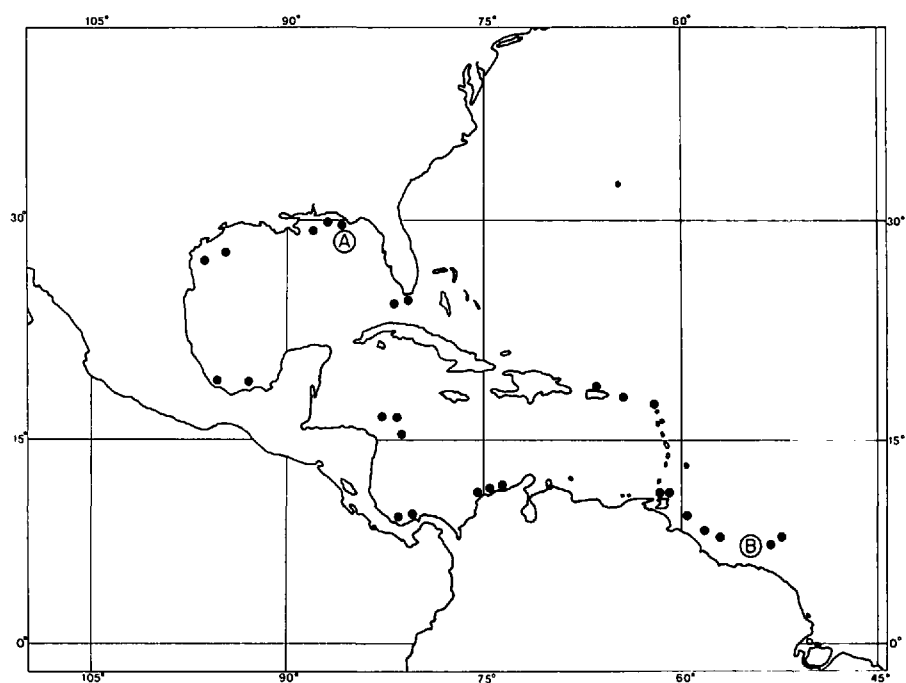


Figure 4. Geographic Distribution of *Lophiodes reticulatus*. Solid dots represent localities where one to three lots of specimens were collected; no dot represents more than three specimens. Open circle A represents 10 lots containing 17 specimens; open circle B, 8 lots and 10 specimens.



Figure 5. A. *Lophiodes caulinaris* TU 72942, 151.7 mm SL, Pacific Ocean off Peru, 03°24'S, 80°45.2'W, 80 m; B. *Lophiodes kempfi* USNM 213718, 99.3 mm SL, Atlantic Ocean off Liberia, 04°26'N, 08°29'W, 200 m.

reaches end of neurocranium; third dorsal spine long (22.7–44.7% of SL), with cirri and pigmentation as previous spine; fourth, fifth, and sixth dorsal spines pigmented as previous spines, each with one or two pairs of small dark tendrils, fourth long, reaches base of soft dorsal fin, fifth and sixth short, not reaching soft dorsal; head long (37.7–44.5% of SL), moderately narrow (52.9–61.1% of HL), and deep (62.2–70.9% of HL); snout long (54.2–65.7% of HL).

Counts (based on 73 specimens): D. VI-8; A. 6; P<sub>1</sub>. 14–16 ( $\bar{x}$  = 15.1); P<sub>2</sub>. I-5; teeth in outer premaxillary row 7–13.

Measurements expressed as percent of standard length (based on 68 specimens; maximum and minimum values are given followed by the mean in parenthesis): head length 37.7–44.5 (40.2); tail length 25.5–37.2 (32.9); illicium length 26.9–39.9 (33.4); second dorsal spine length 21.6–32.6 (28.2); third dorsal spine length 22.7–44.7 (35.4).

Measurements expressed as percent of head length (based on 68 specimens; range and mean as above): head width 52.9–61.1 (57.1); head depth 62.2–70.9 (66.1); snout width 18.0–23.9 (21.1); snout length 54.2–65.7 (59.9).

**Distribution.**—*Lophiodes reticulatus* occurs in the western North Atlantic. The specimens examined in this study were collected between 7°18' and 29°57'N latitude (Fig. 4) at depths ranging from 64 to 366 m and bottom temperatures between 12° and 19°C.

**Relationships.**—*Lophiodes reticulatus* bears close phylogenetic relationship to *L. caulinaris* (Garman, 1899) of the eastern Pacific (Fig. 5-A) and *L. kempfi* Norman, 1935) of the eastern Atlantic (Fig. 5-B). These species share the following character states in common: six well developed dorsal spines (a character state they share with four other species of *Lophiodes*), a well developed fleshy esca which

bears stalked, eye-like appendages; five pairs of conspicuous, enlarged, dark, flattened tendrils located at the angle of the mouth, at the level of the humeral spines, near the gill opening, near the distal ends of the anterior limbs of the opercular bones, and on the tail near the middle of the soft dorsal fin; a relatively wide head (52.9–67.8% of HL); a relatively wide snout (17.1–24.8% of HL), and with the exception of the illicium, dorsal spines of moderate length (second D spine 13.5–32.6% of SL; third D spine 17.1–44.7% of SL). They may be distinguished from each other most easily on the basis of pigmentation and pectoral ray counts. *L. caulinaris* is distinguished by having a vertical row of six light spots on the caudal fin, a light peritoneum, and between 16 and 21 pectoral rays. *L. kempfi* is distinguished by having uniform dark brown pigmentation on the dorsal surface of the head and body, a dark peritoneum, and between 13 and 16 pectoral rays. *L. reticulatus* is distinguished by having a distinct chain-like pattern covering the dorsal surface of the head, body, and pectoral fins, a light peritoneum, and 14 to 16 pectoral rays.

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